

In re Patent Application of
BAHLENBERG ET AL.
Serial No. 09/529,429
Filed: OCTOBER 30, 2000

In the Claims:

This listing of claims replaces all prior versions and listing of claims in the application.

Claims 1-26 (cancelled).

27. (currently amended) A telecommunications system comprising:

a central station;

subscriber lines of different lengths, the subscriber lines being grouped into longer and shorter lines, shorter lines are defined as lines having a length less than X, and longer lines are defined as lines having a length equal to or greater than X, where X is a system parameter determined for a given telecommunications system; and

a plurality of data modems connected to the central station by the subscriber lines of different lengths with duplex data being transmitted between the central station and at least one data modem using very high rate digital subscriber line (VDSL);

frequency divided duplex (FDD) is used at relatively lower frequencies for transmissions over the longer lines and orthogonal frequency divided duplex (OFDD) is used at relatively higher frequencies for transmissions over the shorter lines, the frequencies are relatively lower and higher with respect to each other.

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28. (currently amended) A telecommunications system as claimed in Claim 27 wherein OFDD transmissions include a cyclic prefix; and wherein an extra cyclic prefix is used for OFDD transmissions over shorter lines, and frequencies above an FDD band are not used for longer lines.

29. (currently amended) A telecommunications system as claimed in Claim 28 wherein the extra cyclic prefix is dimensioned for a the shorter lines.

30. (currently amended) A telecommunications system as claimed in Claim 29 wherein the extra cyclic prefix is dimensioned for a line of length X.

31. (currently amended) A telecommunications system as claimed in Claim 28 further comprising optical network units (ONUs) and network terminations (NTs), each comprising at least one transmitter, and being connected to the subscriber lines; time-synchronization being performed between all transmitters in the ONUs and the NTs in the system.

32. (currently amended) A telecommunications system as claimed in Claim 28 wherein a timing advance is calculated for each subscriber line based upon the subscriber line length.

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33. (Previously presented) A telecommunications system as claimed in Claim 27 wherein different sub-carriers are used in up-stream and down-stream transmission directions.

34. (currently amended) A telecommunications system as claimed in Claim 27 wherein a power boost is applied to FDD band transmissions.

35. (Previously presented) A telecommunications system as claimed in Claim 27 wherein both asymmetric digital subscriber line (ADSL) and VDSL are used.

36. (Previously presented) A telecommunications system as claimed in Claim 35 wherein both ADSL and VDSL are used on a single subscriber line.

37. (currently amended) A telecommunications system as claimed in Claim 35 wherein ~~the~~ a frequency band used for FDD is the same as ~~that~~ a frequency band used for ADSL in both up-stream and down-stream transmission directions.

38. (currently amended) A telecommunications system as claimed in Claim 35 wherein ~~FDD band~~ frequencies of the FDD transmissions are power boosted to the same power level as a power level used for ADSL.

39. (currently amended) A telecommunications system comprising:

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a central station;

subscriber lines of different lengths, the subscriber lines being grouped into longer and shorter lines, shorter lines being defined as lines having a length less than X, and longer lines being defined as lines having a length equal to or greater than X, where X is a system parameter; and

a plurality of data modems connected to the central station by the subscriber lines of different lengths with duplex data being transmitted between the central station and at least one data modem using digital subscriber line (DSL);

a first duplex format is used at relatively lower frequencies for transmissions over the longer lines, and a second duplex format, different than the first duplex format, is used at relatively higher frequencies for transmissions over the shorter lines, the frequencies are relatively lower and higher with respect to each other.

40. (currently amended) A telecommunications system as claimed in Claim 39 wherein second duplex format transmissions include a cyclic prefix; and wherein an extra cyclic prefix is used for second duplex format transmissions over the shorter lines, and frequencies above a the first duplex format band are not used for the longer lines.

41. (currently amended) A telecommunications system as claimed in Claim 40 wherein the extra cyclic prefix is dimensioned for a the shorter lines.

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42. (Previously presented) A telecommunications system as claimed in Claim 40 wherein the extra cyclic prefix is dimensioned for a line of length X.

43. (currently amended) A method of transmitting duplex data between a central station and at least one of a plurality of data modems using VDSL in a telecommunications system having the plurality of data modems connected to the central station by subscriber lines of differing lengths, the method comprising:

grouping the subscriber lines being into longer and shorter lines, shorter lines being defined as lines having a length less than X, and longer lines being defined as lines having a length equal to or greater than X, where X is a system parameter; and

using frequency divided duplex (FDD) for transmission at relatively lower frequencies over the longer lines and orthogonal frequency divided duplex (OFDD) for transmission at relatively higher frequencies over the shorter lines, the frequencies are relatively lower and higher with respect to each other.

44. (currently amended) A method as claimed in Claim 43 wherein OFDD transmissions include a cyclic prefix; and further comprising using an extra cyclic prefix for OFDD transmissions over shorter lines, and not using frequencies above an FDD band for transmission over the longer lines.

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45. (currently amended) A method as claimed in Claim 44 further comprising dimensioning the extra cyclic prefix for a the shorter lines.

46. (Previously presented) A method as claimed in Claim 44 further comprising dimensioning the extra cyclic prefix for a line of length X.

47. (currently amended) A method as claimed in Claim 43 wherein the telecommunications system includes optical network units (ONUs) and network terminations (NTs), each comprising at least one transmitter, and being connected to the subscriber lines; and further comprising performing time-synchronization between all transmitters in the ONUs and the NTs in the system.

48. (currently amended) A method as claimed in Claim 43 further comprising calculating a timing advance for each subscriber line based upon the subscriber line length.

49. (Previously presented) A method as claimed in Claim 43 further comprising using different sub-carriers in up-stream and down-stream transmission directions.

50. (currently amended) A method as claimed in Claim 43 further comprising power boosting the FDD band transmissions.

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51. (Previously presented) A method as claimed in Claim 43 wherein both asymmetric digital subscriber line (ADSL) and VDSL are used.

52. (Previously presented) A method as claimed in Claim 51 wherein both ADSL and VDSL are used on the same subscriber line.

53. (currently amended) A method as claimed in Claim 51 further comprising using ~~the~~ a same frequency band for FDD as a frequency band used for ADSL in both up-stream and down-stream transmission directions.

54. (currently amended) A method as claimed in Claim 51 further comprising power boosting the FDD band frequencies to a same power level as ~~that~~ a power level used for ADSL.